UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

JAN 26 1995

In Reply
Refer To: 3HW52

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Richard P. Best
General Manager
Hercules, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Commander
Radford Army Ammunition Plant
Attn: SMCRA-CO
P.O. Box 2
Radford, VA 24141-0099

Re: EPA I.D. No. VA1 21 002 0730
Part B Permit Application
Open Burning Unit

Dear Sirs:

On November 7, 1988 the Part B Permit application was submitted for the Waste Propellant Burning Ground, Solid Waste Management Unit 13, a Subpart X unit, as required by the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments of 1984. Although the Commonwealth of Virginia received final authorization from the Environmental Protection Agency (EPA) to administer much of its hazardous waste program in lieu of the federal RCRA program, the Commonwealth has not received authorization for the 40 C.F.R. Part 264, Subpart X permitting regulations.

As the agency implementing the Subpart X regulations, EPA is considering denying the final Part B operating permit for the Waste Propellant Burning Ground. EPA expects to public notice a tentative decision to deny the permit application within one year.

As you know, the burning ground is adjacent to the New River, less than 100 feet from the riverbank. The New River is used for recreational purposes and is considered a public thoroughfare or "property of others." The interim status standards at 40 C.F.R. Part 265, Subpart P, require a minimum setback distance of 670 feet from the property of others. The Commonwealth of Virginia is authorized to regulate the unit under interim status and has allowed the unit to continue to operate.

The more generic Subpart X permitting standards do not specify a setback distance between an open burning unit and the property of others, but are intended to allow the permitting agency to employ best judgement. EPA believes that less than 100 feet is an inadequate setback distance and is considering denying the Part B Permit application for the waste propellant burning ground.

If you would like to discuss possible alternatives to the use of the waste propellant burning ground, please contact me at 215-597-1812, John J. Humphries, III, Chief, General States Permits Section at 215-597-0320, or Mary F. Beck at 215-597-7239 as soon as possible.

Sincerely,

Christopher B. Pilla, Acting Chief
RCRA Programs Branch
Office of RCRA Programs
Hazardous Waste Management Division

cc: Hassan Vakili, VDEQ
Leslie Romanchik, VDEQ

bcc: Rob Thomson (3HW71)

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Christopher B. Pilla, Acting Chief
RCRA Programs Branch
Office of RCRA Programs
Hazardous Waste Management Division

cc: Hassan Vakili, VDEQ
Leslie Romanchik, VDEQ

bcc: Rob Thomson (3HW71)

CONCURRENCES

SYMBOL ▸	3HW52	3HW52						
SURNAME ▸	Beck MFBeck	Humphries Beck for						
DATE ▸	1/25/95	1/25/95						

EPA Form 1320-1 (12-70) OFFICIAL FILE COP

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

April 17, 1995 95-815-151

U. S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19107

Attention: Ms. Mary Beck

Reference: 3HW52 Letter dated January 25, 1995, EPA I. D. No. VA1 21 002 0730, Part B Permit Application, Open Burning Unit

Dear Ms. Beck

Thank you for the opportunity on April 3, 1995, to review the subject permit application with you, Mr. John Humphries, Ms. Susan Sciarratta, Ms. Linda Carlson, and Mr. Rob Thomson.

We appreciate your understanding of Radford Army Ammunition Plant's (RAAP) need to retain our open burning capability for propellants and explosives. We understand that our volume and frequency of open burning is of concern to EPA since our burning ground is near the New River and is less than the 1250 feet minimum distance from property of others identified in 40CFR265.382. We also understand your concern of ensuring that open burning occurs in a manner that does not threaten human health or the environment.

It is our intent to review the following options and provide information on our assessments by June 1, 1995.

1. RAAP does nothing to the existing permit application and EPA may deny our Subpart X.

2. RAAP moves the burning ground with pans having similar and approved design given to us in the meeting and we resubmit a new permit application or modify the existing application.

3. RAAP and EPA resolve the thorofare issue with the New River and RAAP obtains EPA approval of the containment pan design.

We value your review of the State Variance Request which described the protective measures currently in place that was left with you and would appreciate a copy of the Draft Subpart X Permit Guidance Document to assist in our review.

Please be assured that we will answer all your questions on contamination, distance requirements, operational controls, risk assessments, flooding, description of the burns, and cost analysis regarding each option. We may need your help in providing the information required in a format for presentation to the public should it be necessary.

I will be contacting you in the near future on the status of our review. Should you have any questions, please do not hesitate to call me at (703) 639-8266.

Very truly yours,

C. A. Jake
Environmental Manager

CAJake:gps

W:\815-151

c: Norman Auldridge, DEQ

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

June 1, 1995

95-815-213

U. S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19107

Attention: Ms. Mary Beck

References: 3HW52 Letter dated January 25, 1995, EPA I.D. No. VA1 21 002 0730, Part B Permit Application, Open Burning Limit
Alliant Techsystems, Inc. Letter (95-815-151) dated April 17, 1995

Dear Ms. Beck:

Thank you for meeting with us on May 31, 1995. I hope that the Information Paper on Radford Army Ammunition Plant's Open Burning Ground better addressed your concerns and the video provided additional understanding of how we operate.

Please note that the Rough-Order-of-Magnitude (ROM) estimates described in the paper are dollars that are not fully burdened with engineering and labor costs and do not include detailed safety and design considerations. These estimates were made by Alliant Techsystems and have not been thoroughly reviewed by the Army's review process due to lack of aforementioned details. Also, as we discussed today, Alliant Techsystems cannot commit Army funds.

I appreciate the time you have taken to help me better understand certain aspects of the RCRA programs and permitting and will probably need additional help in the future as the Corrective Action permit progresses.

Please find attached another copy of the Information Paper and video for your files. I have also provided copies to Ms. Romanchik and Mr. Henderson of the Virginia Department of Environmental Quality. Should you have any questions, please do not hesitate to call me at (703) 639-8266.

Very truly yours,

C. A. Jake

C. A. Jake
Environmental Manager

Attachment

CAJ:gps

Report and Video to:

c: T. L. Henderson - Regional Director
Virginia Department of Environmental Quality
3035-E Peters Creek Road, NW
Roanoke, VA 24019

Leslie A. Romanchik
Virginia Department of Environmental Quality
Office of Permitting Management - Waste Operations
P. O. Box 10009
Richmond, VA 23240-0009

Radford Army Ammunition Plant Open Burning Ground

Information Paper

May 1995

The following information is presented to address the Environmental Protection Agency (EPA) Region III's concerns on the safety of recreational boaters on the New River in Virginia during the operation of Radford Army Ammunition Plant's (RAAP's) explosive waste burning ground. This paper also addresses the known environmental contamination associated with these operations.

RAAP has operated the open burning ground for the thermal treatment of waste propellant and energetics since the plant's inception in 1940/1941. Over the years, open burning has proven to be a safe and effective means of demilitarizing waste energetic materials. Open burning/open detonation (OB/OD) of waste reactive materials is performed at many sites across the United States, several of which are presently operating within EPA Region III. Most OB/OD sites are located on property owned by the Department of Defense, though other privately-owned sites exist. RAAP is unique in that it performs only open burning at its facility, not open detonation.

Open burning at RAAP is operated according to rigorous standard operating procedures which ensure complete protection of human health and the environment. Of first and foremost importance is the immediate protection of recreational boaters using the New River. RAAP has not and will not open burn unless all recreational boaters are clear of the area. This procedural control, which is explained in the video, is just one reason why RAAP has maintained a safety record of zero injuries or fatalities related to open burning since 1940/1941.

History of Recreational Boaters on the New River

Limited history was available on the number of recreational boaters who utilize the portion of the New River that flows beside the RAAP open burning ground. Data was available on boats or canoes found on the New River portion that is inside the plant boundaries. This data shows that 87 boats or canoes entered the plant from March 28, 1970 through July 26, 1970; however, there are no records of how many were in the burning ground area preceding each burn (ref. 1). Additionally, data collected during the time period of October 7, 1992, through October 16, 1992, showed three boats were in the area for the two-hour period preceding open burning (ref. 2). Due to the limited data logs, RAAP has started collecting recreational boater data prior to each burn operation. Data collected for the time period of May 1, 1995, through May 25, 1995, shows six boaters were present (ref. 3).

Security and Procedural Controls

RAAP maintains security provisions consistent with requirements in 40 CFR 264.14. Plant security at RAAP is provided by a contract security agency supervised by Alliant Techsystems. A Plant Protection Plan manual is maintained which details security and control measures administered at RAAP. Security Police Standard Operating Procedures are maintained in this manual. Physical security at RAAP includes perimeter patrols, a badge identification system, pre-employment investigations, building and lock inspections, lock and key registration, and plant entrance inspections. Plant security is on duty 24 hours per day, 7 days per week. Entry into the plant is limited through gate entrance badge inspections and gate locks. The outer perimeter of the installation is enclosed with a 7-foot chain link fence with top guard.

Signs reading "US Government Property - No Trespassing" are located approximately every 500 feet on the installation boundary, except where designated limited area fences are not located on or reasonably adjacent to the property boundary. Every 500 feet on limited area fences and at other highly visible locations, such as corners and gates, signs are located on the fence facing outward. The signs state, "US ARMY RESTRICTED AREA - WARNING", and include other verbiage that details unauthorized entry is prohibited.

Explosive waste is not stored or accumulated at the open burning ground. It is delivered in the powder vans, placed directly on the burning pans and ignited that day. Prior to igniting any material in the open burning pans, three loud speakers directed toward the river broadcast a warning message and siren signal. In addition, flashing red lights at both ends of the site are activated and an audible message warning away anyone in the area is delivered. Visual inspections are performed from several locations to ensure that no boaters are present on the river or the adjacent banks. Anyone observed is verbally warned away from the area prior to burning. No operations can occur if anyone is in sight of the open burning area. A sign is posted at the entrance to the open burning grounds with the approved legend "DANGER UNAUTHORIZED PERSONNEL KEEP OUT."

The climate of the Radford area is generally mild. Precipitation in the area averages approximately 40 inches per year. However, the area is susceptible to occasional flooding as a result of an extremely low pressure system. Flooding of the nature to affect open burning operations at RAAP is rare. Two occurrences of significance every 10 years is not uncommon; flooding has occurred on November 6, 1989 and January 15, 1995. To protect against the damages of a flood, RAAP has incorporated strict operating procedures and a contingency plan.

The flood preparation procedures are followed when supervision has sufficient information to assume that the New River will reach flood stage at a height that will cover the open burning pans. In the case of suspected flood conditions, supervision directs the operators to clean all residue from the pans and place this residue into explosive waste containers for transport to a registered accumulation building. All explosive waste containers are removed from the area. The flooding situation is then monitored by supervision and the area is not operated until the situation is stable and the area is deemed ready for open burning.

Fragmentation Hazard to Boaters

The burning ground does not present a fragmentation hazard to boaters on the New River based on tests conducted by Alliant's Hazards Analysis Department. Waste propellants destroyed at the burning ground are prepared such that the reaction on the pads is burning only, thus giving a DOT/NATO symbol hazard classification of Class 1. Division 3 (mass-fire or 1.3). In addition, investigation of the two incidents that occurred in August 1987 and November 1994 demonstrated that there were no fragment hazards produced as a result of the incidents. While the number of incidents indicate a low probability of occurrence, the data does provide a historical basis upon which to judge the results.

A review of 40 CFR, paragraph 365.382, Open Burning; Waste Explosive, reveals that the fragmentation distance table is being employed for the destruction of waste propellant at the Burning Ground. A fragment is defined as one having an impact energy of at least 58 foot/pounds and a hazardous fragment density constituted by at lease one hazardous fragment impacting in an area of 600 square feet or less, per Army Military Document AMC-R 385-100. The fragmentation distances cited in AMC-R 385-100 are utilized to determine safe distances for the destruction of propellants that are 1.1 (mass-detonating) only. They do not allow for 1.3 (mass-fire) and 1.4 (moderate fire, no blast) propellants that are of a lessor classification than 1.1 (mass-detonating). The use of the fragmentation table was intended to be applied to items like projectiles, torpedoes, bombs and/or missiles that would produce scrap metal, broken wood, or concrete pieces. At this time RAAP does not burn any waste energetics that would require the use of the fragmentation table.

It is recommended that the quantity distance table in AMC-R 385-100, Chapter 17, Table 17-12, be applied to this operation based on the most severe hazard involved of Inhabited/Public Traffic distance (ref. 4). This would be in agreement with testing that has been performed and past history (millions of pounds of propellant burned) of our Burning Ground operations. The utilization of the mass-fire table would be in accordance with the operation and AMC-R 385-100, paragraph 17-2(d), which states, "Inhabited building distance for ammunition and explosives which are not mass detonating are based on the most severe hazard involved." In the case of the burning ground, the most severe case is 1.3 (mass-fire), Inhabited/Public Traffic distance, or 75 feet for up to 1,000 pounds of 1.3 ammunition or explosives.

The facts presented concerning incidents that have occurred at the burning ground were considered by the Army Safety Community as acceptable evidence to show that there will be no fragmentation hazards from the burning ground. In order to provide more information upon which to make a sound judgement regarding hazardous missile propagation from the burning ground, incidents involving all types of munitions were examined. There was no debris more than 6 feet from the burning pad. When incidents have occurred, the actual material state and burn conditions have verified that there is an extremely low probability of a hazardous fragment reaching a boater on the New River.

RAAP does not believe that the location of the burning ground is properly characterized by the 1250 feet to the "property of others" as described by the applicable regulations. The burning ground is located adjacent to the New River, and the fenced RAAP property extends along both banks of the New River for more than a mile from the site. The burning ground is located in a valley, and the burning operation in no way affects the adjacent landowners. RAAP has operated the burning ground for over fifty years without mishap.

Human Health Risk Assessment

Environmental Resources Management conducted a risk assessment of a scenario of a recreational craft overturns and the occupants of the craft ingest river water and soils at the site (ref. 5).

Groundwater data from 1994 with a conservative dilution factor for the river was used for the basis. All of the constituents of concern were tested and none of them exceeded Ambient Water Quality Criteria.

Soil data was used from the 1992 RCRA Facility Investigation (ref. 6). All samples taken were at the pans on the inside of the fence. The samples tested for RCRA metal and hazardous constituents of concern at the burning ground. Nine analytes exceeded one of the soil screening criteria. These criteria are chronic screening levels. We do not expect someone to ingest the soil outside the fenced area. All nine analytes occur in nature at levels higher than were detected or the detection limit was not low enough to screen the analyte. This is the case for Thallium. The potential for chronic exposure to any of these is deemed insignificant.

There is no significant health risk to public users of the New River.

Air Quality Assessment

Data submitted in the original Part B Permit application (ref. 7) has shown that open burning activities at RAAP do not in themselves cause violations of the ambient air quality standards. The impact of waste propellant thermal destruction by open burning at RAAP is considered negligible. Only the emission of criteria pollutants were considered in this investigation. The POLU10 modeling analysis conducted by the US Army Environmental Hygiene Agency [now U. S. Army Center for Health Promotion and Preventative Medicine (CHHPM)] indicated that carbon monoxide was the only criteria pollutant emitted from the burning of propellant at the open burning ground. Even though most propellants and explosives contain an abundance of nitrogen compounds, the combustion process occurs under such conditions that yield only elemental nitrogen and ammonia, but no nitrogen dioxide.

The Part B Permit application contains the detailed work regarding air emissions from open burning at RAAP.

Secondary Containment Assessment

Two investigations conducted by CHHPM for surface soil and subsurface soils have demonstrated that the current secondary containment pans have reduced soil contamination (ref. 7).

The first series of tests occurred October 22-26, 1984, when CHHPM conducted an investigation to determine the need of secondary containment based on soil contamination resulting from the operations at the burning ground. The Part B Permit application contains the details of the study. This study was performed when waste propellant was burned on elevated pads that prevented surface water run-on, but not surface water run-off. The analytical results showed the surface soils to be contaminated with substantial concentrations of explosive residues; the residues/surface soil matrixes were not EP Toxic. The residue samples taken directly from burned waste explosives representing a potentially worst case of explosive reactivity were not Reactive. The moderate to low subsurface soil permeability, coupled with rapid surface water run-off resulted in only trace explosive contamination to the subsurface soils and bedrock.

The second series of tests occurred April 6-10, 1987, showing that the western half of the burning ground was relatively free of explosives in the soils. The most contaminated area was in and around pad 3. Although much less contaminated, the next most contaminated sites were between the center berm and pad 4, and the area just east of pad 2. Low levels of trinitrotoluene and nitroglycerin were present in an evaporative pond that is no longer in use.

Run-off from the burning ground into the New River has not demonstrated environmental impact according to the annual benthic survey for October 1994 (ref. 8). Additionally, the 1994 findings were compared with those from 1988 through 1993 demonstrating the overall condition of the New River to be good for aquatic life and that there are no negative impacts on the New River as a result of activities at RAAP.

Secondary Containment Design

The need for secondary containment was assessed should the current burning ground require remediation or relocation. The assessment considered the following options: 1.) RAAP continues operating the burning ground as it exists with the existing pans as defined in the RCRA Part B Permit application, 2.) RAAP continues operating the burning ground with additional secondary containment, or 3.) RAAP relocates the burning ground with the additional secondary containment.

Option 1-The assessment for this option was minimal. A review was conducted with the Army (February 27-March 3, 1995) to ensure that the existing pan design met the requirements as provided in the RCRA Part B Permit application. Based on this review, the design has not changed. The design consists of a pan that is 6 by 18 feet, 1/4 inch carbon steel, 1 foot high with a six-inch clay liner in the bottom. Pans were constructed with full penetration welds.

Option 2-This assessment considered the existing pans resting on a liner (landfill-type) similar to the one provided to RAAP personnel at an April 3, 1995, meeting with EPA Region III. Alliant's assessment notes that modifications will be needed to address the safety concerns of the proposed design. The Safety Department's specific concerns were: a.) material construction of the composite geomembrane liners with protective geotextiles for waste compatibility comparisons, b.) location of the leak detectors close to a thermal operation, c.) potential energy of the leak detectors to initiate any residual solvents and/or propellant that may leach or migrate into this area, d.) confined area situation that would intensify any unplanned event, e.) maintenance repair activities and/or preventive maintenance employee safety considerations, f.) the potential accumulation of propellant and/or nitroglycerin in the protective soil layer would possibly intensify the next burning that would occur on that pad, g.) total dimensions on the engineering sketch is needed to indicate size of dike and other components, and h.) the dike material of construction needs to be identified.

Alliant's Environmental Engineering and Safety Departments liked several aspects of the EPA-proposed design. In order to address our safety concerns, we did a cursory proposal to compact three feet of clay and bentonite to attain 10^{-7} cm/second permeability. This should prevent any leaching and confinement of propellant residues into the soils which is monitored by seven groundwater monitoring wells.

Rough Order-of-Magnitude (ROM) cost estimates for the EPA-proposed design for RAAP's burning ground needs resulted in $254,000. The ROM for RAAP-proposed design resulted in $176,000. These dollars are not fully burdened with engineering and labor costs and do not include detailed safety and design considerations. These estimates were made by Alliant Techsystems and have not been thoroughly reviewed by the Army's Review process due to lack of the aforementioned details.

Option 3-Should the burning ground require relocation, the assessment was conducted using the scenario that the burning ground is moved as the current design exists, except on a smaller scale (2 pans/pad, 4 pads total). This would result in a ROM cost of $500,000. The addition of secondary containment would increase this by $254,000 or $176,000 depending on which containment design, EPA-proposed or RAAP-proposed, is utilized. These dollars are not fully burdened with engineering and labor costs and do not include detailed safety, groundwater monitoring wells, and design considerations. These estimates were made by Alliant Techsystems and have not been thoroughly reviewed by the Army's Review process due to lack of the aforementioned details.

Summary

In the last five years, not a single person (non-employee) has been on the river during over 1300 waste propellant burning occurrences. This has been the case due to low use rate of the river inside the plant. Of the over 1300 burn occasions, there was only one occasion where the burn was delayed until a single boater exited the area of the burning ground.

Procedure controls are in place to ensure that no boaters are in the vicinity of the burning ground during the process of open burning.

Please allow us to point out that the open burning of energetic wastes takes a comparatively short period of time. The burning of pure propellant takes only seconds, since the material is, by its intended use, designed to burn quite rapidly. Once ignited, all the material is consumed, and no further hazards remain. The burning of some propellant ingredients may take a matter of minutes, but they burn at a comparatively low level of intensity, do not pose a detonation hazard, and are easily contained within the burning ground pans. This short period of actual burning allows RAAP to avoid burning when any river boater is nearby. The burning ground operators can observe a broad expanse of the New River, and can assure that burning operations are only conducted when it is impossible for boaters of the river to approach the site. Since burning operations are thereafter effectively over, the location of the site poses no further hazard to river users.

References

1. Safety Program Evaluation, 14-18 September 1987, Radford Army Ammunition Plant, Section III, The New River and Its Bearing on Quantity-Distance Applications.

2. Hercules Memorandum, Burning Grounds-Boat Survey, October 16, 1992.

3. Radford Army Ammunition Plant Burning Ground Log Sheets, May 1-25, 1995.

4. Radford Army Ammunition Plant Petition for Variance from Commonwealth of Virginia Department of Waste Management Hazardous Waste Management Regulations VR 672-10-1, June 1993.

5. Radford Army Ammunition Plant Human Health Risk Assessment-Site 13, Environmental Resources Management, Inc., Roanoke Virginia, May 25, 1995.

6. Remedial Feasibility Investigation of Radford Army Ammunition Plant, Dames & Moore, 1992.

7. RCRA Part B Permit Application for Open Burning at Radford Army Ammunition Plant, Radford, Virginia, Ebasco Services Incorporated, November 1988.

8. Hercules Radford Army Ammunition Plant Benthic Study, Central Virginia Laboratories & Consultants, Inc., Lynchburg, Virginia, October 24, 1994.

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

July 5, 1995

95-815-257

U. S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19109-4431

Attention: Ms. Mary Beck

Subject: Manufacture of Commercial Multibase Powder at RAAP

Dear Ms. Beck:

The purpose this letter is to confirm that EPA concurs with the use of Radford Army Ammunition Plant's open burning ground to treat waste commercial multibase powder. Alliant Techsystems is preparing to relocate its commercial powder manufacturing operations from the Kenvil, New Jersey facility to RAAP. The products will be manufactured under the same SIC code, according to the same process, and using the facilities available at RAAP. This production effort will be conducted by a subsidiary of Alliant Techsystems under the new Facilities Contracting System which allows the use of Army facilities for commercial production.

Waste powder generated from the process will be treated at RAAP's two RCRA treatment facilities, the Waste Propellant Incinerators and the Open Burning Ground. Most of this waste will be treated at the incinerators, while the waste powder which is contaminated with foreign material will be open burned. The waste powder consists of the same compounds presently open burned at RAAP. Attachment 1 is a list of the commercial powder formulations with their respective ingredients. Attachment 2 contains excerpts from RAAP's 1988 Part B Permit Application for Open Burning, including a list of propellant and propellant ingredients open burned on site. The ingredients in the multibase powder are compatible with this list of allowable constituents presently open burned. None of the items prohibited from open burning (see Table C-4 in Attachment 2) will be used in this process.

recd 7/17/95
MB

Alliant would like to begin manufacturing commercial propellant by July of 1996. In order to proceed with our plans, we would appreciate your confirmation of our assessment. More information concerning this relocation effort can be made available.

Very truly yours,

C. A. Jake

C. A. Jake
Environmental Manager

Attachment(s)

c: Mr. Hassan Vakili
Virginia Department of Environmental Quality
Director Waste Operations
P. O. Box 10009
Richmond, VA 23240-0009

MJSullivan:gps